

**Ch. 2****E11:**

$$v = at = (4.2 \text{ m/s}^2)(5 \text{ s}) = 21 \text{ m/s}$$

**E15:**

$$\text{a) } v = v_0 - at = 30 \text{ m/s} - (3 \text{ m/s}^2)(3 \text{ s}) = 30 \text{ m/s} - 9 \text{ m/s} = 21 \text{ m/s}$$

$$\text{b) } d = v_0t - \frac{1}{2}at^2 = (30 \text{ m/s})(3 \text{ s}) - \frac{1}{2}(3 \text{ m/s}^2)(3 \text{ s})^2 = 90 \text{ m} - 13.5 \text{ m} = 76.5 \text{ m}$$

**CP4:**

$$\text{a) } t = (v - v_0)/a = (24 \text{ m/s} - 14 \text{ m/s})/2 \text{ m/s}^2 = 5 \text{ s}$$

$$\text{b) } d = v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(5 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(5 \text{ s})^2 = 70 \text{ m} + 25 \text{ m} = 95 \text{ m}$$

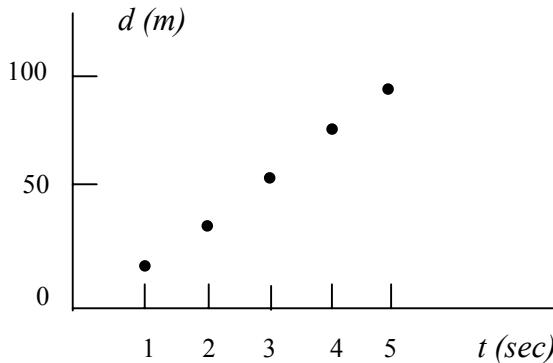
$$\text{c) } d_1 = v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(1 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(1 \text{ s})^2 = 14 \text{ m} + 1 \text{ m} = 15 \text{ m} \quad d_2$$

$$= v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(2 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(2 \text{ s})^2 = 28 \text{ m} + 4 \text{ m} = 32 \text{ m} \quad d_3 =$$

$$v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(3 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(3 \text{ s})^2 = 42 \text{ m} + 9 \text{ m} = 51 \text{ m}$$

$$d_4 = v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(4 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(4 \text{ s})^2 = 56 \text{ m} + 16 \text{ m} = 72 \text{ m}$$

$$d_5 = v_0t + \frac{1}{2}at^2 = (14 \text{ m/s})(5 \text{ s}) + \frac{1}{2}(2 \text{ m/s}^2)(5 \text{ s})^2 = 70 \text{ m} + 25 \text{ m} = 95 \text{ m}$$

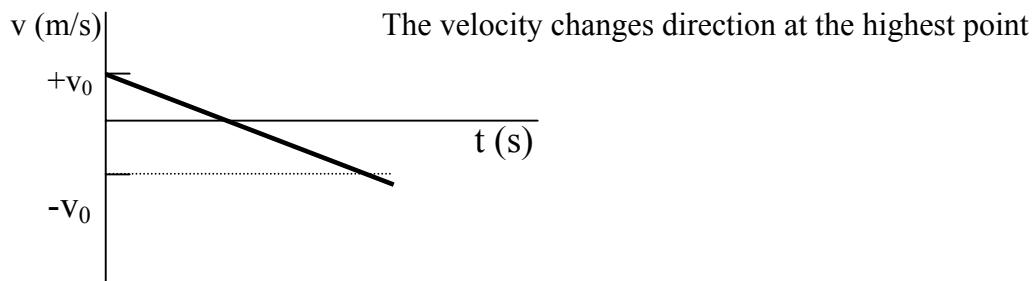


## Ch. 3

### Q9:

No. It is shown that the velocity of the falling object non-linearly increases with time. It means that the acceleration according to the graph is increasing with time.

### Q13:



### Q14:

No. The acceleration will be the same,  $g = 9.8 \text{ m/s}^2$  due to gravity.

### E3:

a)  $v = gt = (10 \text{ m/s}^2) \times (5 \text{ s}) = 50 \text{ m/s}$

b)  $50 \text{ m/s} = 50 \times (1/1609) \text{ mile}/(1/3600) \text{ hour} = 50 \times 2.237 \text{ mile/hour} = 111.87 \text{ MPH} \approx 112 \text{ MPH}$

### E4:

a)  $\Delta t = (60 \text{ s})/(75 \text{ beats}) = 0.8 \text{ s}$

b)  $d = \frac{1}{2} gt^2 = \frac{1}{2} (10 \text{ m/s}^2)(0.8 \text{ s})^2 = 3.2 \text{ m}$

## **Ch. 3:**

### **CP1:**

- a) At the high point the velocity  $v = 0$
- b)  $v = v_0 - gt$ , if  $v = 0$ ,  $v_0 = gt$ , hence  $t = v_0/g = (16 \text{ m/s})/(10 \text{ m/s}^2) = 1.6 \text{ s}$
- c)  $d = v_0t - \frac{1}{2}gt^2 = (16 \text{ m/s})(1.6 \text{ s}) - \frac{1}{2}(10 \text{ m/s})(1.6 \text{ s})^2 =$   
 $= 25.6 \text{ m} - \frac{1}{2}(10 \text{ m/s})(2.56 \text{ s}^2) = 25.6 \text{ m} - 12.8 \text{ m} = 12.8 \text{ m}$
- d)  $d = v_0t - \frac{1}{2}gt^2 = (16 \text{ m/s})(2 \text{ s}) - \frac{1}{2}(10 \text{ m/s})(2 \text{ s})^2 =$   
 $= 32 \text{ m} - \frac{1}{2}(10 \text{ m/s})(4 \text{ s}^2) = 32 \text{ m} - 20 \text{ m} = 12 \text{ m}$
- e) The ball is moving down

### **CP2:**

- a) Ball A:  $v = gt = (10 \text{ m/s}^2)(1.5 \text{ s}) = 15 \text{ m/s}$   
Ball B:  $v = v_0 + gt = 12 \text{ m/s} + (10 \text{ m/s}^2)(1.5 \text{ s}) = 27 \text{ m/s}$
- b) Ball A:  $d = \frac{1}{2}gt^2 = \frac{1}{2}(10 \text{ m/s}^2)(1.5 \text{ s})^2 = \frac{1}{2}(10)(2.25) = 11.25 \text{ m}$   
Ball B:  $d = v_0t + \frac{1}{2}gt^2 = (12 \text{ m/s})(1.5 \text{ s}) + \frac{1}{2}(10 \text{ m/s}^2)(1.5 \text{ s})^2 =$   
 $= 18 \text{ m} + 11.25 \text{ m} = 29.25 \text{ m}$
- c) No. The difference will be the same, 12 m/s, both velocities will increase by  $g = 10 \text{ m/s}^2$  each second.